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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/692,774

10/24/2003

Heon Lee

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11/29/2005

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EXAMINER

TOLEDO, FERNANDO L

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 11/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/692,774	LEE, HEON	
	Examiner	Art Unit	
	Fernando L. Toledo	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 September 2005.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-6 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 7, 10 – 12 and 15 – 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Kim et al. (U. S. Patent 6,806,096 B1).

In re claim 7, Kim, in the U. S. Patent 6,806,096 B1; figures 1 – 16 and related text, discloses a discrete magnetic tunnel junction stack; an etch stop layer 126 of a first electrically conductive material, the etch stop layer is in contact with the stack; and a dual damascene conductor 158 including a first portion spaced apart from the etch stop layer and a second portion extending from the first portion to the etch stop layer; wherein the second portion is self-aligned with the etch stop layer (Column 8, Lines 60 – 65).

3. In re claim 10, Kim discloses a dielectric surrounding the etch stop layer 135/144 and the stack, wherein the first portion is on the dielectric and the second portion extends through the dielectric (Figure 16).
4. In re claim 11, Kim discloses wherein the first portion form lines for the array (Figure 16).

5. In re claim 12, Kim discloses a discrete magnetic tunnel junction stack including a several thin film layers 124 that include a data layer, a reference layer, and a tunnel barrier layer positioned between the data layer and the reference layer (Column 5, Lines 54 – 59); an etch stop layer 126 of a first electrically conductive material, the etch stop layer is in contact with a top portion of the stack (Figure 3); a bottom conductor 120 in electrical communication with a bottom portion of the stack (Figure 3); a dielectric 135/144 surrounding side portions of the stack and the etch stop layer; a self aligning via 152 extending through the dielectric, between the etch stop layer and an upper surface of the dielectric; and a dual-damascene conductor 158 including a top conductor on the dielectric and a via conductor in the via, wherein the via conductor is in contact with the etch stop layer, and the top conductor and the via conductor are unitary (Column 8, Lines 60 –65).

6. In re claim 15, Kim discloses wherein the data layer is positioned at the top portion and the data layer is in contact with the etch stop layer (Column 5, Lines 54 –59).

7. In re claim 16, Kim discloses wherein the reference layer is positioned at the top portion and the reference layer is in contact with the etch stop layer (Column 5, Lines 54 – 59).

8. In re claim 17, Kim discloses wherein the tunnel barrier layer is made from a dielectric material (Column 5, Lines 54 – 59).

9. In re claim 18, Kim discloses several of the magnetic tunnel devices positioned in several rows and several columns of an array (Column 1, Lines 51 – 55); several of row conductors that are aligned with a row direction of the array (Column 1, Lines 51 – 55); and several of column conductors that are aligned with a column direction array (Column 1, Lines 51 –55), each of the several of the magnetic tunnel junction devices is positioned between an intersection of one of the row conductors with one of the column conductors (Column 1, Lines

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51 –55), wherein the several row conductors includes a selected dual damascene conductor 158 or the bottom conductor 120 and wherein the several column conductor includes a selected one of the dual damascene conductor 158 or the bottom conductor 120.

10. In re claim 19, Kim discloses wherein the array is a MRAM array (Title).

11. In re claim 20, Kim discloses wherein the tunnel barrier layer is made from a dielectric material (Column 5, Lines 54 – 59).

***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 8, 9, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim as applied to claims 7, 10 – 12 and 15 – 20 above, and further in view of Zhu et al. (U. S. Patent 5,838,608A).

In re claims 8 and 13, Kim discloses wherein the first material of the etch stop layer is electrically conductive material (Column 6, Lines 3 – 5).

Kim does not disclose wherein the electrically conductive material is aluminum. However, Zhu, in the U. S. Patent 5,838,608 A discloses that MRAM devices have conductive layers that can be made of aluminum, copper or alloys (Column 4, Lines 22 – 25).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the electrically conductive material of Kim made out of aluminum, since as

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taught by Zhu, MRAM devices can be made of aluminum, since it has been held to be within the general skill of a worker in the art to select a known material on the base of its suitability, for its intended use involves only ordinary skill in the art.

14. In re claims 9 and 14, Kim discloses wherein the dual damascene conductor is made of a conductive material.

Kim does not disclose wherein the conductive material is aluminum, alloys of aluminum, tungsten, alloys of tungsten, copper and alloys of copper. However, Zhu, in the U. S. Patent 5,838,608 A discloses that MRAM devices have conductive layers that can be made of aluminum, copper or alloys (Column 4, Lines 22 – 25).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the electrically conductive material of Kim made out of aluminum, since as taught by Zhu, MRAM devices can be made of aluminum, since it has been held to be within the general skill of a worker in the art to select a known material on the base of its suitability, for its intended use involves only ordinary skill in the art.

### ***Response to Arguments***

15. Applicant's arguments filed 14 September 2005 have been fully considered but they are not persuasive for the following reasons.

16. Applicant contests that Kim does not show a dual damascene wherein the first portion has a separation layer between the conductor and the etch stop.

Examiner respectfully submits that Kim, although does not show it in the drawings, it discloses a dual damascene structure as one of the embodiments wherein the first portion of the

dual damascene structure is not in physical contact with the etch stop layer. This is shown in column 8, lines 60 and up.

17. Applicant also contests that Kim does not show a self aligned via.
18. Examiner respectfully submits that Kim does show a self aligned via 152.

### ***Conclusion***

19. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fernando L. Toledo whose telephone number is 571-272-1867. The examiner can normally be reached on Mon-Thu 7am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

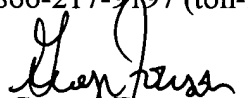
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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



FToledo

26 November 2005



George Fourson  
Primary Examiner  
Art Unit 2823